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PATENT

Attorney Docket No.: 018547-035530US

Client Ref. No.: 3007.1A

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Box Patent Application

Assistant Commissioner for Patents

Washington, D.C. 20231

By:

Bonnie Reckles

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

James L. Winkler et al.

Filed: Herewith

For: **DEVICE AND METHODS FOR
MIXING FLUIDS**

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-referenced application, please enter the
following amendments and remarks.

IN THE SPECIFICATION:

Please replace the paragraph beginning at page 1, line 6 with the following
paragraph:

--This application is a continuation of and claims the benefit of copending
U.S. Patent Application Serial No. 09/487,506 filed January 19, 2000, which is a
continuation of U.S. Patent Application Serial No. 09/032,724 filed February 27, 1998,
now U.S. Patent No. 6,050,719, issued April 18, 2000, which is a continuation-in-part of
U.S. Patent Application Serial No. 09/016,564, filed January 30, 1998 (now abandoned),
the disclosures of which applications are incorporated by reference.--

Please replace the paragraph beginning at page 4, line 14 with the following paragraph:

--In a preferred aspect, the device will be fabricated of transparent plastic materials, such as PLEXIGLAS or other suitable lightweight, rigid, machinable material and be a generally amber color such that wavelengths of light in the range of 200 nm to 700 nm will be filtered out.--

Please replace the paragraph beginning at page 6, line 20 with the following paragraph:

--End pieces 22 and 24 each include a set of apertures 30 as best shown in Fig. 1. Apertures 30 are employed to couple a lid 32 to end pieces 22 and 24. As shown in Fig. 1, lid 32 is in an open position. In Figs. 2-4, lid 32 is in a closed position. Lid 32 is coupled to end pieces 22 and 24 by rods 34, which in turn are attached to lid 32 by brackets 36. A spring 38 is disposed within each of brackets 36 to bias rods 34 toward their respective aperture 30 so that lid 32 will be secured to end pieces 22 and 24 when in the closed position.--

Please replace the paragraph beginning at page 6, line 30 with the following paragraph:

--The elements used to construct body 12 will preferably comprise a generally rigid, heat resistant material that may withstand temperatures that are within the range of from about 30 °C to about 60 °C, and more preferably from about 40 °C to about 50 °C. Conveniently, the elements used to construct body 12 comprise a plastic material, with a preferable material being sold under the trade name of Plexiglas. Other suitable lightweight, rigid, machinable, heat resistant materials including acrylic, a LUCITE material, styrene, polystyrene, and polycarbonate may also be used. Conveniently, the elements may be constructed to be essentially transparent so that visualization into body 12 may be facilitated. In a preferred embodiment, the elements are generally amber in

color such that wavelengths of light in the range of 200 nm to 700 nm, and more preferably 250 nm to 600 nm, will be prevented from passing therethrough.--

Please add the following new paragraph at page 8, after line 21 as follows:

--In particular, as described in U.S. Application Serial No. 08/485,452, now U.S. Patent No. 5,945,334, selected fluids are introduced into and out of the cavity via the inlet port and the outlet port. In some embodiments, the inlets/outlets are located at opposite ends of the cavity. This configuration improves fluid circulation and regulation of bubble formation in the cavity. The bubbles agitate the fluid, increasing the hybridization rate between the targets and complementary probe sequences.--

IN THE CLAIMS:

Please cancel all claims 1-32.

Please add new claims 33-40 as follows:

33. (New) A system for facilitating the mixing of a fluid, the system comprising:

at least one cartridge having a chamber partially filled with a fluid to form a bubble therein, wherein the chamber includes a pair of closely spaced-apart faces that are separated by walls to define a narrow interior for holding the fluid; and

a holding device that comprises a rotatable body having a rotational axis, wherein the rotatable body includes at least one mounting element that is adapted to mount a cartridge such that the fluid within the chamber is agitated by the bubble during rotation of the rotatable body.

34. (New) A system as in claim 33 wherein the fluid contains at least one target molecule and the chamber includes a polymer array containing complementary probe sequences adapted to be placed in fluid communication with the fluid, wherein agitation of the fluid by the bubble increases the hybridization rate between the target and the probe sequences.

35. (New) A system as in claim 33, wherein the walls of the chamber are set at angles sufficient to agitate the fluid when rotated.

36. (New) A method for facilitating the mixing of a fluid, the method comprising:

providing a cartridge having a chamber partially filled with a fluid to form a bubble therein, wherein the chamber includes a pair of closely spaced-apart faces that are separated by walls to define a narrow interior for holding the fluid;

placing the cartridge within a holding device that comprises a rotatable body having a rotational axis, such that the fluid within the chamber is agitated by the bubble during rotation about the rotational axis; and

rotating the rotatable body about the rotational axis such that the bubble agitates the fluid to mix the fluid within the chamber.

37. (New) A method as in claim 36 wherein the walls of the chamber are set at angles sufficient to agitate the fluid when rotated.

38. (New) A method for mixing a fluid containing a least one target molecule, the method comprising:

providing a cartridge having a chamber partially filled with a fluid to form a bubble therein, wherein the chamber includes a pair of closely spaced-apart faces that are separated by walls set at angles sufficient to agitate the fluid when rotated and a polymer array containing complementary probe sequences adapted to be placed in fluid communication with the fluid; and

rotating the cartridge about a rotational axis so that the fluid within the chamber is agitated during rotation by the flow of the fluid changing direction as it engages the chamber walls and by the bubble.

39. (New) A method as in claim 38 wherein the agitation of the fluid increases the hybridization rate between the target molecules and the complementary probe sequences.

40. (New) A method for mixing and heating a fluid, the method comprising:

- providing an oven having an open interior;
- providing a cartridge having a chamber partially filled with a liquid to form a bubble therein, wherein the chamber is defined by a pair of closely spaced-apart faces to define a narrow interior for holding the fluid;
- removably coupling the cartridge to a rotatable body having a rotational axis such that the fluid within the chamber is agitated by the bubble during rotation about the rotational axis;
- rotatably positioning the rotatable body within interior of the oven so that the rotatable body is rotatable about the rotational axis, and rotating the rotatable body about the rotational axis such that rotating the rotatable body about the rotational axis such that the bubble agitates the fluid to mix the fluid within the chamber; and
- supplying heat to the interior of the oven while rotating the rotatable body

REMARKS

This preliminary amendment is submitted along with a continuation application of copending Application Ser. No. 09/487,506, filed January 19, 2000. In accordance with 37 CFR 1.53(b), the continuation application comprises a copy of the original specification, including claims, of the grandparent application, Application Ser. No. 09/032,724 (now U.S. Patent No. 6,050,719), a copy of the Declaration filed in the grandparent application and a copy of the Drawings filed in the grandparent application (amended to add reference numeral 12 in Fig. 1, reference numeral 42 in Fig. 2 and reference numeral 40 in Fig. 3).

The specification has been amended to add a reference to related applications, which are incorporated by reference. In addition, the specification has been amended to expressly include a paragraph incorporated by reference into the original specification. See, for example, page 8, lines 4-8, wherein Application Ser. No. 08/485,452 (now U.S. Pat. No. 5,945,334) is incorporated by reference. Replacing the material incorporated by reference with the actual text is not new matter. See, for

example, MPEP 2163.07(b). The actual text incorporated into the specification by this amendment is found at col. 7, lines 7-13 of U.S. Patent No. 5,945,334.

All of the claims in the original application have been canceled and replaced with new claims 33-40. Attached hereto as Appendix A captioned "Version with Markings to Show Changes Made" is a marked-up version of the changes made to the Specification by the current amendment.

CONCLUSION

Examination of the application, as amended, is respectfully requested. If the Examiner believes that a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,

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APPENDIX A

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The first paragraph beginning at page 1, line 6 has been replaced as follows:

~~This application is a continuation-in-part of U.S. Patent Application Serial No. 09/016,564, filed January 30, 1998, the full disclosure of which is incorporated herein by reference.~~

This application is a continuation of and claims the benefit of copending U.S. Patent Application Serial No. 09/487,506 filed January 19, 2000, which is a continuation of U.S. Patent Application Serial No. 09/032,724 filed February 27, 1998, now U.S. Patent No. 6,050,719, issued April 18, 2000, which is a continuation-in-part of U.S. Patent Application Serial No. 09/016,564, filed January 30, 1998 (now abandoned), the disclosures of which applications are incorporated by reference.

Paragraph beginning at line 14 of page 4 has been amended as follows:

In a preferred aspect, the device will be fabricated of transparent ~~plexiglass~~ plastic materials, such as PLEXIGLAS or other suitable lightweight, rigid, machinable material and be a generally amber color such that wavelengths of light in the range of 200 nm to 700 nm will be filtered out.

Paragraph beginning at line 20 of page 6 has been amended as follows:

End pieces 22 and 24 each include a set of apertures 30 as best shown in Fig. 1. Apertures 30 are employed to couple a lid 32 to end pieces 22 and 24. As shown in Fig. 1, lid 32 is in an open position. In Figs. 2-4, lid 34 32 is in a closed position. Lid 32 is coupled to end pieces 22 and 24 by rods 34, which in turn are attached to lid 32 by brackets 36. A spring 38 is disposed within each of brackets 36 to bias rods 34 toward

their respective aperture 30 so that lid 32 will be secured to end pieces 22 and 24 when in the closed position.

Paragraph beginning at line 30 of page 6, has been amended as follows:

The elements used to construct body 12 will preferably comprise a generally rigid, heat resistant material that may withstand temperatures that are within the range of from about 30 °C to about 60 °C, and more preferably from about 40 °C to about 50 °C. Conveniently, the elements used to construct body 12 comprise a plastic material, with a preferable material being sold under the trade name of PLEXIGLAS. Other suitable lightweight, rigid, machinable, heat resistant materials including acrylic, ~~lucite~~ a LUCITE material, styrene, polystyrene, and polycarbonate may also be used. Conveniently, the elements may be constructed to be essentially transparent so that visualization into body 12 may be facilitated. In a preferred embodiment, the elements are generally amber in color such that wavelengths of light in the range of 200 nm to 700 nm, and more preferably 250 nm to 600 nm, will be prevented from passing therethrough.

A new paragraph after line 21 of page 8 has been added as follows:

In particular, as described in U.S. Application Serial No. 08/485,452, now U.S. Patent No. 5,945,334, selected fluids are introduced into and out of the cavity via the inlet port and the outlet port. In some embodiments, the inlets/outlets are located at opposite ends of the cavity. This configuration improves fluid circulation and regulation of bubble formation in the cavity. The bubbles agitate the fluid, increasing the hybridization rate between the targets and complementary probe sequences.

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MIXING FLUIDS

REMARKS

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

REMARKS

This application is a continuation of and claims the benefit of copending
U.S. Patent Application Serial No. 09/487,506 filed January 19, 2000. Enclosed herewith
is a Petition for three-months extension of time for the aforesaid patent application
thereby extending the due date for response to the that application from October 31, 2001

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Respectfully submitted,

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